tional Museum through the great kindness of Dr. Leonhard Stejneger, is thoroughly representative for the whole western hemisphere and includes many forms from all other parts of the world, Africa, Europe, temperate Asia, the East Indies and Australia being well represented. Southern Asia is the only region from which there is but little material. Clear presentation of the taxonomic conditions shown in the rather large amount of data necessitates a more elaborate classification of the Opalinidæ than that generally in use. In the year 1918 I published a classification of the Opalinidæ. The completed review of all the material shows that this classification, if elaborated somewhat will be a clearer expression of the real facts. I therefore now propose the following classification:

Ciliata
  Protociliata
    Opalinidæ
      Protoopalininæ
        Protoopalina
        Zelleriella, new genus
      Opalininæ
        Cepedea, new genus
        Opalina
          Opalinæ angustæ (occidentales)
          Opalinæ latæ (orientales)
  Euciliata

The Opalinidæ are placed as an appendage of the Ciliata, being separated from the other Ciliata by the fact that they have not developed macronuclei and micronuclei, and by some features of their life history. They show, both in their structure and possibly in their life history, decided indication of relationship to the Trichonymphidæ which are usually regarded as an appendage of the Flagellata.

From the Opalinidæ I exclude all the genera of Ciliata astomata, which have nuclei of two sorts, leaving, only those forms which, with the exception of my own recent usage, have been included in the genus *Opalina.* The Opalinidæ include both binucleated and multinucleated species and these should be assigned to distinct subfamilies.

The Protoopalininæ include the genera *Protoopalina* (cylindrical binucleated forms) and *Zelleriella*[1] (flattened binucleated forms). The Opalininæ also include two genera, *Cepedea*[2] (cylindrical multinucleated species) and *Opalina* (flattened multinucleated species). The latter genus includes two groups of species—the western hemisphere forms, which are for the most part narrow, especially posteriorly, and the eastern hemisphere species, all of which are broad. All the other Ciliata may be classed as Euciliata in distinction from the Protociliata which include only the Opalinidæ.

There are two species which do not accurately fit into this classification as defined. They are *Protoopalina quadrinucleata* from *Rana macrodon* of Java and *Protoopalina axonucleata* from *Bufo bufo asiaticus* of eastern Asia. These species will be described in a paper soon to go to press. They are mentioned here merely because the former usually has four nuclei and the latter usually shows six to twelve nuclei. They are transitional forms between the genera *Protoopalina* and *Cepedea,* but are classed with the former genus because of the histological character of their nuclei which resembles that of the *Protoopalina* nucleus.

Maynard M. Metcalf
The Orchard Laboratory,
Oberlin, Ohio,
May 20, 1920

THE OHIO ACADEMY OF SCIENCE

The thirtieth annual meeting of the Ohio Academy of Science was held at the Ohio State University, Columbus, May 14 and 15, 1920, under the presidency of Professor F. C. Blake. Sixty-nine members were registered as present; thirty new members were elected.

The executive committee reported the completion of the affiliation of the academy with the American Association for the Advancement of Science in accordance with the plan adopted by the association at the Christmas meeting.

[1] Named for Ernest Zeller who in the year 1877 published a fine paper upon the European species of the family.

[2] Named for Cassimer Cepede whose studies upon Ciliata astomata clearly showed that the Opalinidæ are to be regarded as quite distinct from the other astomatous forms.

It was reported by the trustees of the Research Fund that Mr. Emerson McMillin, of New York City, had made a further contribution of two hundred and fifty dollars to the research fund. In view of his continued financial support of the research work of the academy Mr. McMillin was elected a patron; he was also elected to fellowship in the academy on the strength of his own contributions to science.

The following special resolutions were adopted by the academy:

1. Recording appreciation of the work of the Ohio Biological Survey and expressing the hope that its work, now financially crippled, may be continued with increased support.

2. Urging the utmost watchfulness in the conservation of platinum and condemning its use "in jewelry and in any other way that is not productive of scientific or industrial advance or development."

3. Urging a like conservation of potassium and the use, wherever practicable, of sodium salts as a substitute for potassium salts in scientific and commercial work.

4. Endorsing the work of the State Department of Agriculture in establishing preserves for game and other wild life of the state, and appointing a committee to cooperate in this work. This committee, under the chairmanship of Professor Herbert Osborn, of Ohio State University, is in position to cooperate also in the nation-wide movement in this direction instituted by the Ecological Society of America and endorsed by the American Association for the Advancement of Science.

Officers were elected as follows: *President,* W. H. Alexander, Weather Bureau, Columbus; *Vice-presidents:* Zoology, F. H. Krecker, Ohio State University; Botany, C. H. Otis, Western Reserve University; Geology, W. H. Bucher, University of Cincinnati; Physics, D. C. Miller, Case School of Applied Science; Medical Sciences, Ernest Scott, Ohio State University; Psychology, H. A. Aikins, Western Reserve University; *Secretary,* E. L. Rice, Ohio Wesleyan University; *Treasurer,* A. E. Waller, Ohio State University.

The scientific program was as follows:

PRESIDENTIAL ADDRESS

The Einstein theory of relativity and gravitation: PROFESSOR F. C. BLAKE, Ohio State University.

PUBLIC LECTURE

Photographing sound waves from large guns and projectiles: PROFESSOR DAYTON C. MILLER, Case School of Applied Science.

SYMPOSIUM BEFORE PHYSICS SECTION

The constitution of the atom: (*a*) *The planetary atom of the physicist:* S. J. M. ALLEN; (*b*) *Why not one kind of atom only?* R. C. GOWDY; (*c*) Discussion led by W. L. EVANS.

PAPERS

The Arizona boll weevil (Anthonomus grandis var. thurberia) with special reference to steps taken by the Arizona Commission of Agriculture and Horticulture to prevent its establishment in cultivated cotton: DON C. MOTE.

Aphelopus theliae (Gahan) and the changes produced in Thelia by this parasite: S. I. KORNHAUSER.

The intestinal parasites of overseas troops as compared with home service troops: S. I. KORNHAUSER.

A new disease, black tumor, of the catfish: R. C. OSBURN.

Classification of the Opalinidae: MAYNARD M. METCALF.

Geographical distribution of the Opalinidae: MAYNARD M. METCALF.

Factors in the distribution of aquatic snails in Lake Erie: F. H. KRECKER.

Caddis-fly larvae as agents in distribution of fresh water sponges: F. H. KRECKER.

Notes on some tropical Homoptera: HERBERT OSBORN.

Generic and specific characters from the male genitalia of Syrphidae (Diptera): C. L. METCALF.

Some myriapods of Put-in-Bay: STEPHEN R. WILLIAMS.

Claws of arachnids: W. M. BARROWS.

The chondrocranium of Syngnathus fuscus: J. E. KINDRED.

Additions to the birds of Ohio: LYNDS JONES.

Bird migration groups: LYNDS JONES.

Two recently destructive clover insects of western Ohio: T. H. PARKS.

The preservation of native flora and fauna: HERBERT OSBORN.

New economic applications for the mangrove: H. H. M. BOWMAN.

The progress of revegetation in the Katmai district: ROBERT F. GRIGGS.

Observations on the edge of the forest in the Katmai district: ROBERT F. GRIGGS.

The influence of environment on sexual expression in the hemp: J. H. SCHAFFNER.

A double mutant of the hemp: J. H. SCHAFFNER.

Translocation and storage of carbohydrates in apple fruit spurs and two-year-old seedlings: SWARNA KUMER MITRA.

Origin and character of schizogenous resin cavities in avocado fruits and leaves: Swarna Kumer Mitra.

Origin and character of adventitious roots in Cornus pubescence: Swarna Kumer Mitra.

Story of citrus fruits of Pinellas County, Florida: Katharine Dooris Sharp.

Factors controlling transpiration: Jasper D. Sayre.

Certain conditions that hinder the study of botany in high schools: Maximilian Braam.

Progress in plant microchemistry: H. C. Sampson.

Sugar syrup from home grown sugar beets: James R. Withrow.

Some farm experiments in the making of syrup from sugar beets: F. C. Vilbrandt.

Some pertinent questions for Ohio scientists: (a) Sulphuric acid and kiln plants and their fumes; (b) The errors of Ohio's legal kerosene flash point apparatus—the Foster cup; (c) The unnecessary use of potassium salts; (d) The damage to science and industry by the wastage of platinum: James R. Withrow.

Partial solution of certain applied chemical problems: (a) Saving of platinum by the use of platinum crucibles in electroanalysis; (b) By a modified mercury cathode cell; (c) The determination of water in substances easily decomposable thermally: James R. Withrow.

Gas combustion investigations: (a) Quartz-apparatus; (b) Central burner type; (c) Devitrification of quartz in capillaries: F. C. Vilbrandt.

The thermionic tube as a useful amplifying tool of the scientist: A. D. Cole.

A seasonal breakage of watch springs and its cause: Samuel R. Williams.

Springs of minimum weight: H. C. Lord.

Relations between atomic numbers and the wave lengths of X-rays: S. J. M. Allen.

Relations between absorption coefficients and wave lengths of X-rays: S. J. M. Allen.

Characteristic curves of different types of thermionic tubes: A. D. Cole.

Thermodynamics: Louis T. More.

Electrification by impact: Harold Richards.

On self and mutual elastance and capacitance: F. C. Blake.

Note on a double solenoid for the production of uniform magnetic fields: S. J. Barnett.

Observations on eruptive phenomena in the Valley of Ten Thousand Smokes: Robert F. Griggs.

Diastrophism still continuing in the Great Lakes region: E. L. Moseley.

Clarion and Vanport members in Ohio: Wilber Stout.

A pre-somite human embryo: C. L. Turner.

Relation of catalase to activity: R. J. Seymour.

Some features of industrial fatigue: E. R. Hayhurst.

Epidemic encephalitis: Ernest Scott.

Measurement of blood pressure by resistance of carbon discs: E. P. Durrant.

Educative characteristics of first grade children: Mary E. Miller.

A study of the lowest five per cent. of college students as determined by the army alpha examination: Helen Marshall.

A study of the highest five per cent. of college students as determined by the army alpha examinations: Earl R. Gabler.

Experimentation in the psychology of music: Esther L. Gatewood.

Mental and educational tests of the deaf: Jeannette Reamer.

Syphilis and delinquency: Florence Mateer.

DEMONSTRATIONS

Black tumor of the catfish: R. C. Osburn.

Some interesting tropical Hemiptera: Herbert Osborn.

Caddis cases covered with sponges: F. H. Krecker.

Wax models of 8 mm. and 12 mm. chondrocrania of *Syngnathus:* J. E. Kindred.

Models of pre-somite (Mateer) human embryo: C. L. Turner.

Specimens from the Valley of Ten Thousand Smokes: Robert F. Griggs.

Wireless telephone: R. A. Brown.

Edward L. Rice,
Secretary

Delaware, Ohio

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